AARSE

African Association of Remote Sensing of the Environment
Association Africaine de Télédétection de l'Environnement

NEWSLETTER • APRIL 2020

CONTENT

HEADLINES

Message from the President

With the COVID-19 pandemic uppermost in our minds I invite you albeit on a grave note with the editorial team to learn about some developments in the world of scientific activity and remote sensing in Africa and around the world in this April 2020 edition of the AARSE Newsletter. The COVID-19 pandemic is still running rampant world-wide...p3

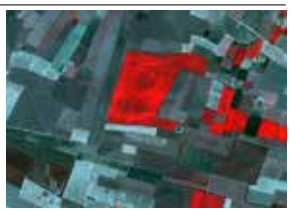
AARSE 2020 Conference deadlines extended

The 13th AARSE International Conference, AARSE 2020, Earth Observations and Geospatial Science in service of Sustainable Development Goals will be held in Kigali, Rwanda from 26th to 30th of October, 2020...p4

GMES and Africa consortia serves entire continent

The Global Monitoring for Environment and Security and Africa (GMES and Africa) is a joint initiative of the African Union Commission and the European Commission launched on 7 December 2007 at the 2nd EU-Africa Summit in Lisbon...p7

Discovery of an African Space Institution CRTS (Morocco)



Morocco's Royal Centre for Remote Sensing (CRTS) was created by decree in December 1989 with the mandate to exploit and develop remote sensing applications in collaboration with ministerial departments, private operators and Moroccan universities...p8

African Space Science Personality: Prof GB Bénié

Prof Goze Bertin Bénié's distinguished career as academic, researcher, institutional collaborator and facilitator of numerous government geomatics science projects spans more than four decades and is difficult to capture in one article such as this...p10

Copernicus Masters 2020 open for submissions

Submissions can now be made until 30 June this year to Copernicus Masters 2020, a program initiated by the European Space Agency (ESA) in 2011 and presented as a competition to inspire future-oriented applications and services...p11

COVID-19: Chinese lessons for Africa

The novel coronavirus disease (COVID-19) was first reported in the Chinese city of Wuhan on 31 December 2019. The genetic sequence of the virus was shared with the World Health Organization (WHO) on 12 January 2020 and the first case appeared outside China...p12

COVID-19 puts some mayor NASA projects on hold

The COVID-19 Pandemic has forced NASA to have most of its employees working from home and suspend work on some of its mayor projects. At the same time it is keeping time-sensitive mission-critical launches, or work to protect life...p16

From the Editor

Those of us following the endeavors of the human race in outer space are from time to time reminded of one big danger lurking out there in its vastness which could suddenly and unexpectedly turn on us and wipe out life here on Earth. That would of course be a large asteroid or comet which collides with our planet.

No wonder many of the top minds in the space business are focused on the challenges to devise strategies which could avert this potential calamity. NASA for instance has a dedicated Center for Near Earth Object Studies, which, with the help of a number of observatories around the world track Near-Earth Objects that could collide with our planet.

Next year NASA will launch a satellite for its Double Asteroid Redirection Test (DART) to slam into a moonlet (a small natural satellite) of near-Earth asteroid Didymos, that is comparable in size to an asteroid that could pose a threat to us. Effectively they will test what sort of energy is needed to change the asteroid's course by disturbing the orbit of its moonlet.

It is indeed empowering to know that the satellite industry is so advanced that we can throw the best we have at a problem such at this because we can. So, while at times our confidence is bolstered so much that we fall short of collapsing into bouts of self-congratulations we forgot to watch our backs while a silent and invisible enemy crept up on us. That enemy is called the COVID-19 Pandemic which has destructive powers equal to a monster asteroid.

Never before in the history of the human race has one ailment stretched its tentacles so far and wide with so much effect. Sure, the Black Death and the Spanish flu also caused devastation on a large scale, but they were contained in some continents. The COVID-19 Pandemic has reached just about every country in the world and proved that no-one can escape it whether it be the rich, the powerful or the poor. It forced a global lockdown which apart from the tragic deaths will have knock-on effects on economies and our way of life still to be assessed at a later scale. It is safe to say the world is going to be a different place when this is all over.

From our perspective the usefulness of Earth Observation and remote sensing tools in this battle to contain the virus were first proved by the Chinese which we report on in this issue. They fought a stellar battle and applied just about every remote sensing tool available to contain the spread of the virus in their country.

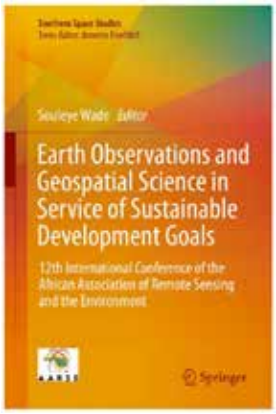
The COVID-19 Pandemic exposed the vulnerability of the human race and bared our Achilles heel. It literally brought us down to Earth if you'll pardon the pun.

Anthony Penderis

Editor

newsletter@africanremotesensing.org

Springer publishes 12th AARSE Conference papers



A book containing peer-reviewed articles delivered at the 12th International Conference of the African Association of Remote Sensing of the Environment held in Alexandria, Egypt in 2018 has just been published by Springer publications. The title is Earth Observations and Geospatial Science in Service of Sustainable Development Goals with Souleye Wade as the editor. A comprehensive overview of the publication will be given in the June edition of the AARSE Newsletter. The book of 193 pages is available in hardcover or as an eBook and can be ordered online at www.springer.com. Contact customerservice@springermature.com for more information.

AARSE Editorial Contact Details

The AARSE Newsletter is an official publication of the African Association of Remote Sensing of the Environment. During the year 2020 it will be published at least six times starting February 2020 and thereafter every second month until December 2020.

Website: http://www.africanremotesensing.org/

General Enquiries: info@africanremotesensing.org

President
Prof. Kamal Labbassi
Chouaib Doukkali University, El Jadida, Morocco
kamal_labbassi@yahoo.fr

Communications Manager
Dr Souleye Wade
CEO African Institute of Geomatics Technical Director BEST (Bureau d'Etudes en Sciences de la Terre & Environnement)
President ASPG (Association Sénégalaise des Professionnels de la Géomatique); www.aspg-sn.org
wadesouleye@yahoo.fr

Newsletter Editor
Anthony Penderis newsletter@africanremotesensing.org

To unsubscribe from this newsletter please send an email to newsletter@africanremotesensing.org

Message from the President

Dear Readers

With the COVID-19 pandemic uppermost in our minds I invite you albeit on a grave note with the editorial team to learn about some developments in the world of scientific activity and remote sensing in Africa and around the world in this April 2020 edition of the AARSE Newsletter.

The COVID-19 pandemic is still running rampant world-wide with more than 2 million people affected and at least 150 000 deaths reported by mid-April while some 20 000 cases and 1000 deaths were from the African continent.

While we are bracing ourselves for the worst we are at the same time extremely grateful that the African continent seems at this stage to have mercifully escaped the brunt of the COVID-19 pandemic.

Pandemics off course are not new to Africa as we have had our fair share of ravaging illnesses such as Cholera, Yellow Fever, Ebola and SARS to name but a few. We have to take into account the vulnerability of the African health systems and as it is our business to educate and guide Africans in the application of satellite technologies we have learned that prevention is better than cure. In this context remotely sensed data can provide valuable information on how to predict potential outbreaks and track existing epidemics.

The problem with COVID-19 being a novel disease is that there are no physical-environmental or seasonal data available that might be possibly linked to the disease. The UN Spider Program and ESA's Epidemio Project typically apply remote sensing data to fight off epidemics. They mostly focus on a region's landscape such as rainfall, vegetation, water bodies, elevation, dust mapping, temperature and population density which are favourable to harbour various epidemic hosts and therefore pinpoint areas where people are at greater risk.

At this stage therefore we must take a lesson out of the Chinese book which we report on in this issue. They acted decisively by imposing restrictive mass quarantines or lockdowns while at the same time they applied the tools of remote sensing on a large scale. Most of these methods can also be applied on the African continent should it become necessary.

We sincerely hope that Africa will be spared this ordeal.

Prof. Kamal Labbassi

AARSE President 2018 - 2022

Advertise in our June 2020 edition

The bimonthly newsletter of the African Association of Remote Sensing of the Environment (AARSE) offers an ideal opportunity to those who wish to expand their African footprint in the arena of Earth Observation and Geoinformatics. The newsletter is distributed electronically to a select audience of some 6000 recipients whom include inter alia most African national space agencies, governmental space research institutes and space technology companies. It is also published on the AARSE website and the Facebook Page Space News Africa

The newsletter is a minimum of 16 pages with content normally divided as follows: AARSE News (25%); Africa Space News (50%); International Space News (25%);

DISCOUNTS: 30% discount per placement for June 2020 newsletter only;
INVOICING: An invoice will be generated within a few days after a booking has been received;
PAYMENTS: Per EFT prior to placement on Materials Deadline Day;
MATERIAL: Advertising material to be supplied in high resolution jpeg of pdf format;
EDITORIAL ASSISTANCE: AARSE's Editorial team can assist with writing, layout and editing of Advertorials.

Deadlines June 2020 Newsletter
Booking Deadline: Friday, 29 May 2020
Materials & Payments Deadline: Friday, 5 June 2020
Publishing Deadline: Last week June 2020

See samples of previous newsletters here.
See more detail on AARSE Advertising here.
Contact newsletter@africanremotesensing.org for costs and more info.

AARSE joins Copernicus Masters 2020

The African Association of Remote Sensing of the Environment is proud to join the Copernicus Masters 2020 as a Regional Associate this year. The Copernicus Masters is the leading innovation competition for commercial Earth observation (EO) applications since 2011 and promotes innovative solutions, developments and ideas that use EO data to tackle challenges faced by business and society.

With more than EUR 550,000 worth of prizes this year there is an opportunity for great minds to boost their business with big data from space. The Copernicus Masters 2020 offers participants a diverse range of topic-specific challenges to tackle global challenges with their competition entries. The 7 competition partners - the European Space Agency (ESA), the European Commission (EC), the German Aerospace Center (DLR), Planet, BayWa, Airbus sobloo and the German Federal Ministry of Transport and Digital Infrastructure (BMVI) have each established a unique challenge for the participants, with individual prize pools designed to support the winner to further develop its solution.

As a Regional Associate it strengthens AARSE's resolve to be part of the constantly growing EO community as well as the EO business ecosystem. The competition is open for submissions until 30 June 2020.

See more at https://copernicus-masters.com.

AARSE 2020 Conference registrations extended due to COVID-2019 Pandemic

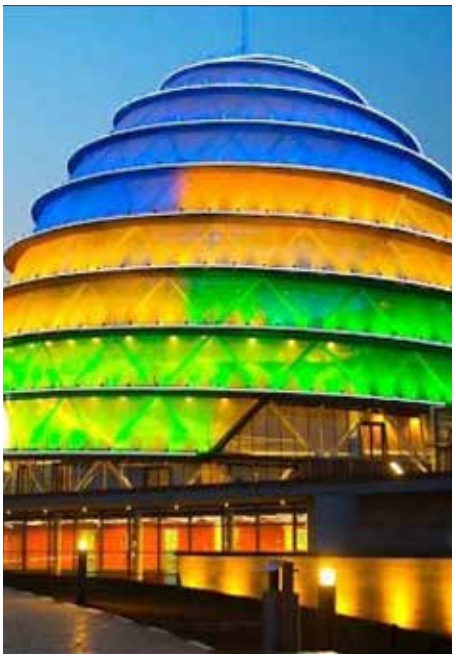
The 13th AARSE International Conference, AARSE 2020, Earth Observations and Geospatial Science in service of Sustainable Development Goals will be held in Kigali, Rwanda from 26th to 30th of October, 2020. The conference under the theme Space and geospatial technologies for the Africa we want will be a major event in the African and international community of Earth observation and geo-spatial information science in 2020. It will be organized by the African Association of Remote Sensing of the Environment (AARSE) and the Institut d'Enseignement Supérieur de Ruhengeri (Ines-Ruhengeri).

However, following the coronavirus (COVID-19) pandemic the world is currently battling, we would like to inform you that the 13th AARSE International Conference 2020 is currently still being planned and organized by the African Association of Remote Sensing of the Environment (AARSE) in collaboration with Institut d'Enseignement Supérieur de Ruhengeri (Ines-Ruhengeri) in Rwanda. It will still be held in Kigali Conference and Exhibition Village (KCEV), Kigali, Rwanda, from 26th to 30th of October, 2020. Further, communication will be made with regards to whether the some conference dates will be re-scheduled like extension of the dates of submitting the abstracts based on the COVID-19 reports. This is due to the fact that the organizing committees have been receiving some emails of people requesting for extension as they are blocked from accessing their workplaces for finalizing their abstracts on time.

The main objective of AARSE 2020 is to bring together scholars and professionals from the African and international community to present their latest achievements, discuss challenges and share experiences in space and geospatial technologies. The conference program will feature keynote speeches delivered by leading policy makers, scholars, technical sessions with reports of the latest research outcomes, discussion sessions on operational topics such as capacity building, Spatial Data Infrastructure (SDI), space policy, programs and projects, as well as commercial exhibitions showing the latest products and services in remote sensing and geospatial information technologies. Final paper selection will still be based on abstracts and full paper peer review following the guidelines provided in the "Call for Paper" document alongside the details of the registration fees that is currently available in the conference website www.aarse2020.org.

Abstracts have to include enough information on the thematic focus, methodology, contribution to knowledge, policy making, implementation, etc. to be considered for review. They are currently being received and should be submitted in Microsoft Word format. The submission deadline has been extended for both the abstracts and the full paper and a date of the deadline will be provided in the next issue of the newsletter. Please keep safe and stay home until the COVID-19 pandemic is under control.

Text supplied by Ines-Ruhengeri



Some images of the Kigali Conference and Exhibition Village (KCEV) in Kigali, Rwanda where the AARSE Conference 2020 will be held. Images by www.visitrwanda.com.

Six travel scholarships on offer for AARSE 2020 Conference

AARSE is pleased to announce that this year up to six travel scholarships will be awarded to support young African-resident remote sensing practitioners or students to attend the AARSE CONFERENCE 2020 in Rwanda from 26 to 30 October 2020. AARSE invites eligible persons to apply for a 2020 IEEE GRSS - AARSE TRAVEL FELLOWSHIP through the application form which can be downloaded at http://africanremotesensing.org/opportunities/

This travel fellowship is structured to support travel costs (air fare, ground transport in Rwanda and possible ground transport if living more than 50 km from an international airport), accommodation and registration fees to attend the conference. Beneficiaries of the fellowships shall be African scientists or students who have had a paper accepted for oral or poster presentation at the AARSE biennial or IGARSS annual conferences plus they should meet the following requirements:

1. An application form and all supporting documents, including an extended abstract (up to two pages), have been received by the Evaluation Committee by 31 May 2020.
2. The recipient shall have submitted a full paper for the conference for platform or poster presentation in accordance with the deadlines and the formatting style set by the conference organisers.
3. The recipient is a citizen of an African country whose current place of residence is in Africa at the time of the application.
4. The recipient must be a registered member of AARSE or IEEE-GRSS by 31 August 2020.
5. Preference will be given to young and mid-career professionals (within 10 years of award of doctoral degree). The professional status (student, lecturer, professor) shall otherwise not be basis for exclusion.
6. The recipient has not previously received an award for one of these fellowships.
7. Applicants shall submit the online application with following documents:
   a. A copy of the applicant's CV.
   b. An extended abstract (up to two pages or 1000 words maximum) of the conference presentation.
   c. A letter of motivation and commitment. This letter shall include:
      i. A declaration that the applicant has not previously been awarded an IEEE GRSS/AARSE Travel Fellowship.
      ii. A declaration that the applicant is a member of AARSE or IEEE GRSS, or will become a member on or before 31 August 2020.
      iii. A commitment that the applicant will submit a trip report to the Board of Trustees within one month after the conference.
      iv. A commitment that the applicant will acknowledge sponsorship in their presentation, and in any publication resulting directly from the conference presentation, with words: "The author acknowledges financial support through an IEEE GRSS/AARSE TRAVEL FELLOWSHIP".
8. Exclusions: The support package will not include any cash disbursements on site. Meal expenses other than provided as part of the conference registration and other incidental expenses will be for the applicants own account. Cost of applying for a passport will be for the applicant's account. Costs of visa applications may be considered depending on funding availability and employment/student status of applicant

To allow adequate time for evaluation, visa applications and travel arrangements, the Evaluation Committee will make provisional awards by 31 July 2020. The Evaluation Committee will determine from the Conference Technical Committee whether the applicant's paper has been accepted by the reviewers. Therefore, applicants should not wait to hear if their paper has been accepted before submitting their application. The deadline for submission of the application is 31 May 2020. Should the applicant fail to submit a full manuscript by the specified deadline, the Evaluation Committee reserves the right to withdraw the provisional award and shall not be liable for any expense incurred by the applicant.

Please complete the online application form and send it (together with the attachments mentioned above) not later than 31 May 2020 by email to all three addresses below:

Prof Mike Inggs: mikings@gmail.com
Prof Harold Annegarn: hannegarn@gmail.com
Prof Peter Zeil: peter.zeil@sbg.ac.at

AARSE Conference 2020 call for abstracts

Deadline extended due to COVID-2019 pandemic

Interested parties are invited to submit abstracts for the AARSE 2020 Conference and should take the following into account.

Main Theme

Space and geospatial technologies for the Africa we want.

Sub-themes

1. Remote sensing for natural resource management
2. EO and geospatial information for sustainable -human security
3. Geospatial information for smart city development
4. Space and geospatial technologies for land administration and management
5. Space technology for environmental monitoring and sustainability
6. Space technology in natural hazard and disaster management
7. Integrated geospatial technologies in agriculture and food security
8. Remote sensing Climate change adaptation and mitigation strategies
9. African Space Development under the African Space Agency
   a. Space Capacity building and utilization
   b. Innovative space technologies
10. Big data analysis and spatial data infrastructures

Abstracts have to include enough information on the thematic focus, methodology, contribution to knowledge, policy making, implementation, etc. to be considered for review.

Find the abstract form and submission link here and please note that a new extended deadline will be announced on the website soon. (http://www.aarse2020.org/abstracts.php#)

Call for expression of interest to host AARSE conferences

The African Association of Remote Sensing of the Environment (AARSE) invites expression of interest from national institutional members and/or other organizations/agencies in Africa for the hosting/organization of the 14th Conference of the Association in 2022. Bids can also be received for the 15th edition (2024) and the 16th edition (2026). The conference is usually held in the last week of October of every even-number year.

The expression of interest should clearly indicate the following points:

- Name of championing organization including history of the organization and statement of previous hosting of international conference(s) of similar magnitude;
- Names, affiliations and contact details of the lead person and members of team making the proposal;
- Names of supporting government organizations, universities, national geospatial associations, UN agencies, NGO/Civil society organizations and other organizations in the country supported by letters of intent from such organizations;
- Suggested main theme of the conference;
- Indication of city and proposed venue(s) for the conference, including capacities of main hall, breakout rooms and exhibition space and internet access capability. Where available, academic institutions are the preferred venues;
- Name(s) of nearest airport and airlines plying the route;
- Availability and types of hotels and tourism locations;
- Indication of ease of visa processing (presence of embassies in most African countries);
- Indication of the strength of AARSE membership and potential for membership growth, as well as geo-information activities in the country;
- Other useful information, such as strength of the commercial geospatial sector, number of universities offering geospatial training, national geospatial infrastructure such as satellite receiving stations.

For the 2022 edition, first preference will be given to applicants from the West Africa sub- region followed by southern Africa sub-region in line with the AARSE principle of rotational hosting. It should be noted that AARSE does not provide funds for the hosting organization but the Association can and will solicit for international funding on behalf of the organization towards a successful hosting of the conference, and provide guidance to the Local Organizing Committee on soliciting sponsorships and commercial exhibitors within the host country.

Interested organizations are encouraged to address any further inquiries to either Prof. Kamal Labbassi or Dr. Solomon Tesfamichael (see contact details below) regarding a possible bid. This solicitation of a conference host is an open process and may be discussed with any of the AARSE Council members. We plan to reach a decision on a host country and organization at the AARSE 2020 conference taking place in Kigali City, Rwanda from 26th to 30th October 2020, therefore each applicant will be expected to attend and make a presentation to the AARSE Executive Council during the conference. However, discussions will be ongoing until suitable hosting arrangements have been finalized. The expression of interest should be sent at latest by 1st September 2020 to:

Dr. Solomon Tesfamichael
Secretary General: AARSE
Email:
sgtesfamichael@uj.ac.za

With a copy to:
Prof. Kamal Labbassi
President: AARSE
Email:
kamal.labbassi@africanremotesensing.org
labbassi@ucd.ac.ma
kamal_labbassi@yahoo.fr

The opening of the 12th biennial International Conference of the African Association of Remote Sensing of the Environment (AARSE 2018) held in Alexandria, Egypt from 25 - 29 October 2018 at the Abu Quir Campus of the Arab Academy for Science, Technology and Maritime Transport. This milestone conference was attended by no less than 177 representatives from 37 countries. A total of 8 keynote speeches were delivered at the Plenary Sessions supplemented by a further 19 Technical Sessions and 5 Workshops. The 13th AARSE Conference will be held in Kigali City, Rwanda from 26th to 30th October 2020. See more at www.aarse2020.org

AARSE Conference Record 1996 - 2018

To achieve its objectives, AARSE conducts a biennial (once every two years) international conference in Africa in addition to other awareness, research and capacity building activities.

Up to 2018, AARSE, with the support of local and international organizations, has organized twelve such conferences respectively in Harare (Zimbabwe) in 1996, Abidjan (Côte D'Ivoire) in 1998, Cape Town (South Africa) in 2000, Abuja (Nigeria) in 2002, Nairobi (Kenya) in 2004, Cairo (Egypt) in 2006, Accra (Ghana) in 2008, Addis Ababa (Ethiopia) in 2010, El Jadida (Morocco) in 2012, Johannesburg (South Africa) in 2014, Kampala (Uganda) in 2016 and Alexandria (Egypt) in 2018.

The conference usually takes place during the last week of October. The 13th conference will take place from 26th to 30th October 2020 in Kigali, Rwanda (see www.aarse2020.org) on the theme "Space and geospatial technologies for the Africa we want". The attendance at each of these conferences is in the order of 500 local and international participants and exhibitors.

For further information on AARSE, including the benefits of membership and how to become a member, please visit www.africanremotesensing.org.
The themes for the previous conferences can be found at http://africanremotesensing.org/aarse-conferences/

GMES and Africa serves entire continent through 12 consortia

The Global Monitoring for Environment and Security and Africa (GMES and Africa) is a joint initiative of the African Union Commission and the European Commission launched on 7 December 2007 at the 2nd EU-Africa Summit in Lisbon. The GMES & Africa Support Programme was signed in December 2016. It serves as a framework for the development and implementation of Earth Observation-based services that support sustainable development in Africa. The pillar of GMES & Africa Support Programme is the European Copernicus programme which constitutes a major source of data, information and technological expertise.

The general objective of the GMES and Africa Support Program is to promote the sustainable management of natural, water, marine and coastal resources by providing evidence-based interventions to provide information for decision-making processes. The specific objective is to improve the capacity of African policymakers and planners to design, implement, and monitor national, regional and continental policies and sustainable management of natural, water, marine and coastal resources through the use of EO data and derived information.

The GMES and Africa Support Programme Management Unit (PMU) is based in the African Union Commission Science and Technology Division of the Department of Human Resources, Science and Technology (HRST). It currently consists of 6 personnel with Dr. Tidiane Ouattara at the helm as Support Program Coordinator, Dr. Bachir Saley (Senior Officer Natural Resources and Water), Mr. Meshack Kinyua-Ndiritu (Training Officer), Mr. Adiatou Fatty (Communication Officer), Mr. Lottie Musenga-Sinyangwe (Monitoring and Evaluation Officer) and one position of Senior Officer for Marine and Coastal area to be filled.

Twelve consortia were selected through a competitive call for proposal process which was announced on 13 May 2017 and closed on 21 August 2017. The leaders, partners, and associates of the chosen consortia cover 45 African countries including 122 African institutions. The leader of each project with their titles and base country follow in alphabetical order below.

1 ***Agence Gabonaise d'Etudes et Observations Spatiales (AGEOS)/Gabon***

Monitoring and evaluation of Central Africa forest

2 ***Commission Internationale du Bassin Congo-Oubangui-Sangha (CICOS)/Democratic Republic of the Congo***

Management of water and natural resources in Central Africa

3 ***Centre de Suivi Ecologique (CSE)/ Senegal***

Use of Earth Observation data in support of Sustainable Management of Wetlands to Strengthen Food Security and Ecosystem Resilience in West Africa (GH-ZHAO)

4 ***Centre for Space Science and Technology Education (CSSTE)/Nigeria***

Multi-scale Flood Monitoring and Assessment Services for West Africa (MiFMASS)

5 ***IGAD Climate Prediction and Applications Centre (ICPAC)/Kenya***

Monitoring Natural Resources and Food Security in East Africa Region

Dr. Tidiane Ouattara, GMES & Africa Support Program Coordinator

6 ***Observatoire du Sahara et du Sahel (OSS)/Tunisia***

Earth observation for sustainable management of land and water in North Africa

7 ***Regional Centre for Mapping of Resources for Development (RCMRD) /Kenya***

Land degradation monitoring and assessment, wetlands monitoring and assessment and Open Geographical Regional Reference Vector Database

8 ***Southern Africa Service Centre for Climate Change and Adaptive Land Management (SASSCAL)/Namibia***

Wetland Assessment and Monitoring Platform for Transboundary River Basins in Southern Africa (WeMAST)

9 ***Council for Scientific and Industrial Research (CSIR)/South Africa***

GMES-Africa Marine and Coastal Service Development for Southern Africa (MarCoSouth)

10 ***Mauritius Oceanography Institute (MOI)/ Mauritius***

Marine and coastal management in the East Africa Region

11 ***National Authority for Remote Sensing and Space Science (NARSS)/ Egypt***

Developing an Earth Observation Operational Application for Coastal Ecosystems Mapping, Monitoring and Assessment of the Northern African Coastal Zone - EOOS (NAfCoast)

12 ***University of Ghana (UoG)/Ghana***

Marine and coastal areas management in Western Africa

The AUC through its HRST Director Dr. Mahama Ouedraogo remains responsible for the approval of operational aspects of the GMES & Africa support program such as annual work plans, budgets and recruitment. This is a 4-year project which will come to an end by December 2020. This EUR 30 million joint Programme is co-financed by the European Commission and the African Union Commission.

For more information and contact details see
https://gmes4africa.blogspot.com/;
https://gmesafrica-tat.gaf.de/;
http://gmes.africa-union.org/;
https://au.int/en/GMESAfrica/services

In our series Discovery of an African Space Institution, in this issue, we focus on the Royal Centre for Remote Sensing or Le Centre Royal de Télédétection Spatiale (CRTS) in Morocco. See more at https://www.crts.gov.ma

Discovery of an African Space Institution

Morocco's Royal Centre for Remote Sensing (CRTS) was created by decree in December 1989 with the mandate to exploit and develop remote sensing applications in collaboration with ministerial departments, private operators and Moroccan universities in the country. The CRTS is situated in Rabat the capital city of Morocco.

Missions

The Royal Centre for Remote Sensing (CRTS) is a governmental institution in charge of the promotion of remote sensing applications and related technologies for the benefit of different ministerial departments and operational agencies for more effective management of socio-economic development projects and programs.

To achieve these goals, the CRTS actions are structured around four strategic axes:

- To assist and support users to make effective use of satellite images and space-derived remote sensing products;
- To provide all users with optimal access to Earth Observation data and Geospatial Information;
- To strengthen national and regional capacities and to develop skills through workshops and training programs; and
- To develop knowledge and promote Earth Observation applications through research and development activities.

Since the two Moroccan satellites Mohammed VI A & B were put into orbit in 2017 and 2018 respectively, the operational exploitation of space applications in Morocco and the activities of the CRTS have entered a new phase of development and extension to make spatial tool a strategic lever for socio-economic development.

International cooperation is a central pillar of CRTS activities, by means of partnership relations with international institutions, operators of earth observation systems and space agencies.

Cooperation with African countries is a fundamental component of the CRTS strategy to contribute to the development and promotion of space technologies in Africa. In addition to active participation in several regional projects such as Tiger, SMAS, Life, GMES-Africa, etc. The CRTS attaches particular interest to the development of African capacities in the space field, in particular through its continuous training program, the contribution to the training of African managers in close collaboration with the CRASTE-LF and the organization of conferences and workshops such as the CRTS-IAF conference on "Space for emerging countries" held in Marrakech in April 2019

Sectors and themes

The CRTS conducts projects in partnership with ministerial departments, government agencies and private operators to provide them with tailored information and operational solutions for the implementation of their programs and strategies at national, regional and local levels.

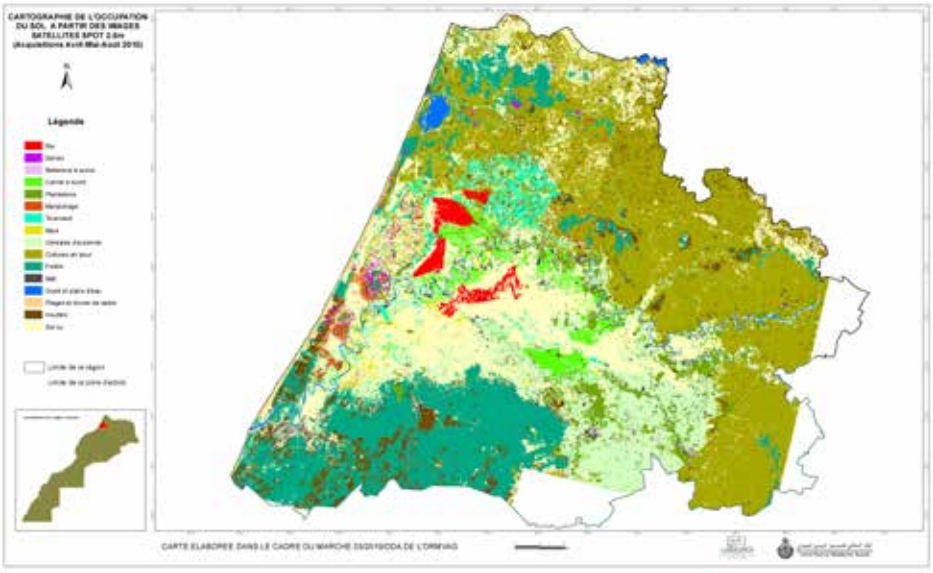
The implementation of these projects could take various forms and approaches to answer specific needs and requirements of the end-users. The value-added applications and products conducted within the frame work of the CRTS activities cover numerous themes related to the economic, environmental and territorial issues such as: agriculture; forestry resources; land management; oceanography and coastal zones; water resources; geology; and mining resources.

Access to geospatial data

The CRTS has set up the required technical tools and satellite data acquisition infrastructures to enable users easy and fast access to spatial data adapted to their needs.

Online archiving, cataloguing and management platforms for all image data and value-added products are implemented to ensure the availability and sustainability of satellite data covering the national territory;

Continued on page 9 ...



Land-Cover/Land-Use map of the Gharb Region elaborated by CRTS for the Regional Irrigation Office (2010)

...continued from page 8

build a multi-date archive for comparative studies; and diversify satellite images sources to meet specific needs.

The CRTS is mandated to distribute images acquired by the Moroccan satellite Mohammed VI A & B to all national users.

Capacity building

The CRTS periodically organizes workshops to raise awareness among decision makers and proposes training programs for executives and technicians in government departments, public and private institutions as well as universities.

These annual, on-demand or project-based training modules cover the entire geomantic and remote sensing sectors. The courses are intended to meet the needs for initiation or improve skills of users in terms of production, processing and management of geospatial information and their applications.

A dedicated training facility equipped with specific tools offers a practical learning environment.

Research & development

In collaboration with national and foreign universities and research centres the CRTS conducts research programs aimed at developing new methodologies and innovative approaches for the valorisation of space data. This applied research deals with specific issues related to national and regional contexts.

To disseminate the results of research programs and encourage knowledge sharing in the fields of space technologies the CRTS publishes and distributes the annual Geo Observateur review.

CRTS projects to support sustainable development programs

Agricultural Resources Management

The combination of satellite images, together with field information, meteorological data and land surveying allow operators of the agricultural sector (Ministry of Agriculture, irrigation agencies, privates companies, farmers, etc.) to have access to tailor-made products that meet their specific needs such as:

- Dynamic maps of land-use;
- Crop monitoring indicators and production statistics;
- Agricultural campaign monitoring bulletin and cereal production forecasts;
- Information on irrigated lands;
- Water consumption and productivity parameters and indicators; and
- Maps to follow up on major agriculture investment projects.

Disaster and Risk Management

Within the framework of the European Commission program called SCHEMA, a generic approach based on modeling scenarios from satellite data and in-situ data was developed to produce a set of maps along the Atlantic coasts of Morocco which included: Tsunami risk maps; maps of vulnerability classes; and maps of damage levels.

The Ministry of Interior and the Civil Protection Authority was the main end-users of the project outputs.

Territorial and Urban Development

Satellite data constitute strategic tools for a relevant territorial management. They provide a good understanding of the available resources in terms of their distribution, evolution and the dynamics of interaction between different actors, options and conflicts of use.

The Ministry of Interior, urban agencies, local authorities, etc. are using remote sensing images and their derived products to: Produce maps of territorial land uses and their evolution; Characterize the urbanized areas; Monitor and control construction dynamics in peri-urban areas; and develop and update master plans and territorial development plans.

Water Resources Management

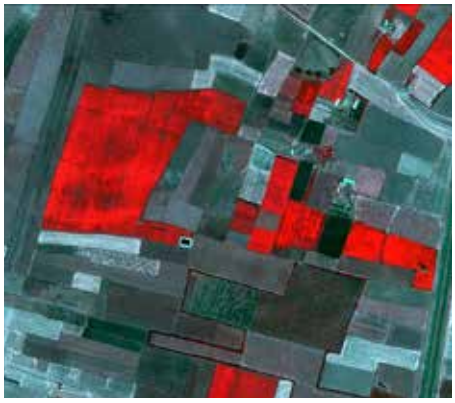
The LDAS Morocco project was designed to improve Water Resources Management and to reinforce national capacities. The project was co-funded by the Global Environment Facility (GEF) and World Bank and managed by CRTS in cooperation with national and international partners (NASA, USAID, ICARDA and ITC).

Several platforms integrating satellite data, in situ observations and physical models of land surface have been developed and made available to end-users such as:

- Land Information System and flood forecast modeling for the Water Department;
- Composite Drought Index (Ministry of Agriculture and irrigation agencies);
- Evapotranspiration (ET) and soil moisture; and
- Locust hazards

Text and images supplied by CRTS.

The deep-water port Port of Tangier-Med located on the slope of the Strait of Gibraltar, about 40 kilometres from the city of Tangier.

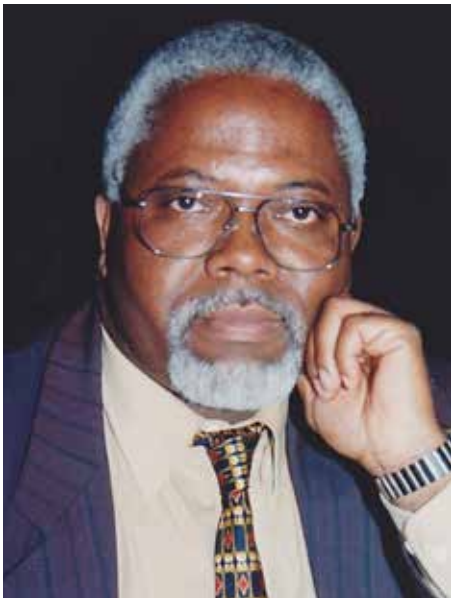


A CRTS elaborated image of the agricultural region near Settat a city in Morocco between Marrakech and the national capital Rabat.

The Ouarzazate Solar Power Station in the Drâa-Tafilalet region in Morocco which is the world's largest concentrated solar power plant.

Focus on an African Personality in Space Science and Technology

Prof Goze Bertin Bénié



Prof Goze Bertin Bénié's distinguished career as academic, researcher, institutional collaborator and facilitator of numerous government geomatics science projects spans more than four decades and is difficult to capture in one article such as this. We nevertheless give a brief overview of his main achievements.

He graduated from Laval University in Quebec City, Canada first with a Bachelor's Degree then went on to a M.Sc in Photo-grammetry and Remote Sensing and then a Ph.D. in Photogrammetry and Remote Sensing at the same university. Since then he went on to become an expert in geomatic sciences and one of the African pioneers in this field where he has been working since 1977, first as a student then as manager and specialist in research and development of software and systems.

As an academic and reseacher he served as full professor at the University of Sherbrooke, Canada from 1995 to 2000 and as visiting professor at numerous other institutions such as the Senghor University in Alexandria, University of Montpellier III in Montpellier and the Pantheon-Sorbonne University in Paris, France. In the process he published 60 articles in peer-reviewed scientific journals plus another 38 in peer-reviewed conference proceedings. His February 2020 Researchgate statistics give him a rating of 28.2 with 1,033 citation and 6,243 readings.

He furhter acted as a supervisor for at least 25 doctoral and 40 masters students as well as 10 diploma graduates, 15 post-doctoral trainees and 15 research trainees.

As an institutional collaborator and facilitator his reach was far and wide and include numerous positions such as :

- President of the Quebec Remote Sensing Association from 2001-2003;
- Member of the thematic school "Models of the city" of the UMRMAP (School of Architecture of Marseille, France) in 2001;
- Co-founder of the AFRICAGIS African Forum in 1993;
- Co-chair of the Consortium of University Remote Sensing Laboratories of Quebec (COLUTEQ) from 1996-1997;
- Founder and head of the ESTRITEL research group (Specialized Image Processing Team) at the University of Sherbrooke from 1999-2005;
- Co-founder of the Research Group in Digita Image Analysis (GRAIN) of the University of Sherbrooke;
- Member of IEEE – GERS from 1999-2005;
- Researcher member of CARTEL (University of Sherbrooke) since 1990;
- Associate researcher at the Laval University's Center for Geomatics Research in Quebec from 2001-2004;
- President of the Scientific Council of LERG (Cheikh Anta Diop University of Dakar, Senegal from 2005-2010; and
- Founding member of the Geomatics of Health Research Group (GEOMEDUS) at the University of Sherbrooke, 1999-2005.

He facilitated funding amounting to several million dollars for research and development contracts from provincial, federal and international sources such as the World Bank, Canadian Space Agency, United Nations Development Program (UNDP), the Millennium Challenge Corporation (MCC) of the United States, African Development Bank, Luxembourg Development Agency (LuxDev) and Government services of several countries such as Canada, Côte d'Ivoire and Benin.

Prof Bénié's awards and nominations gathered in his lifetime says a lot about his status and the recognition he received for a job well done. They include inter alia:

- Personality of the Year 2010 by the Association of Foreign Students of the University of Sherbrooke;
- VIP member of Who's Who from 2013-2016;
- Appointment as Scientific Commissioner of the Canada Sub-Commission for the 50th anniversary of Côte d'Ivoire in 2010.
- Recognition of Immigrant Award 2008 from Quebec in the Senior Researcher Category.
- Medal of honor from the Vietnam Academy of Sciences in 2005 (Geographic Sciences);
- Congratulations from the Mekong River Commission and the Canadian Space Agency for the Mekong Emergency Response System (MERS) Project; and
- Appointment as Chairman of the Board of Directors of the consulting engineering company, Géoimage Solutions Inc. (Canada) since 2004.

Copernicus Masters 2020 now open for submissions

Submissions can now be made until 30 June this year to Copernicus Masters 2020, a program initiated by the European Space Agency (ESA) in 2011 and presented as a competition to inspire future-oriented applications and services using Earth Observation (EO) data. It is open to all SMEs, start-ups, universities, and individuals in the fields of business, research, and higher education that tackle important challenges faced by business and society.

Copernicus the European Union's Earth Observation Program supplies near-real-time data at global level from its constellation of 6 families of satellites known as the Sentinels , and dozens of third-party satellites known as "contributing space missions". Open access is granted to all data collected and available for free. The types of data collected through the Copernicus program can be divided into six main categories namely Atmosphere Monitoring; Marine Environment Monitoring; Land Monitoring; Climate Change; Emergency Management; and Security.

This year until 30 June participants in the Copernicus Masters 2020 can submit their innovative EO application or service to 7 challenges offered by the following partners: European Space Agency (ESA), the European Commission (EC), the German Aerospace Center (DLR), Planet, BayWa, Airbus sobloo and the German Federal Ministry of Transport and Digital Infrastructure (BMVI). At the same time, they have the possibility of entering up to 13 brand-new Copernicus Prizes co-funded by EC with up to EUR 10,000 each. The total value of all the prizes combined is EUR 550,000. The overall winner will receive an additional cash prize of EUR 10,000.

Participants can apply in two categories, namely the Copernicus Masters Partner Challenge and the optional Copernicus Prizes awarded in cooperation with various regional or country partners. The Copernicus Masters Partner Challenge has nine categories with their individual fields of expertise summarized as below. Go to https://copernicus-masters.com/#challenges for more information.

1 ESA Digital Twin Earth (DTE) Challenge

2 DLR Environment, Energy & Health Challenge

3 Planet "See Change, Change the World" Challenge

4 Baywa Smart Farming Challenge

5 Airbus Sobloo Multi-Data Challenge

6 BMVI Digital Transport Challenge

7 EU Space Data for New Business Applications Challenge

8 EU Space For "Blue Economy" Challenge

9 University Challenge

Participants must demonstrate their innovative use of EO data across a wide variety of challenge topics such as Artificial Intelligence (AI), machine learning, cloud computing, data analytics, health, smart farming, and digital transportation. Since 2011, the program has attracted more than 4 000 participants from 50 countries. The prize pool is worth EUR 550,000 this year. To find out more and to apply follow this link https://copernicus-masters.com/. To improve your case also watch the Master Business Series of 10 short turorials at https://copernicus-masters.com/apply/

Winners Copernicus Masters 2019

On 4 December 2019, the festive Awards Ceremony of the Copernicus Masters took place in front of an international audience during the EU Space Week 2019 in Helsinki, Finland. The 7 Challenge Winners recognised during the Awards Ceremony were the following:

1 **ESA Copernicus 4.0 Challenge**
ConstellR – *Taking Our Planet's Temperature During Climate Change* submitted by Max Gulde, ConstellR, a spin-off from Fraunhofer EMI

2 **DLR Environment, Energy & Health Challenge**
ajuma UV-Bodyguard – *Take Sun Protection to the Next Level* submitted by Julian Meyer-Arnek, ajuma GmbH

3 **Planet "See Change, Change the World" Challenge**
Green City Watch – Measure the Quality of Urban Nature submitted by Nadinè Galle, Green City Watch

4 **BayWa Smart Farming Challenge**
Audili – Remote Soil Analysis submitted by Armin Schöpf, Audili OG

5 **Airbus sobloo Multi-Data Challenge**
remotIO-X – Retrieval of Motion and Potential Deformation Threats submitted by Matus Bakon, insar.sk Ltd.

6 **BMVI Digital Transport Challenge**
ERMES – *Extensive Road Monitoring Early-Warning System* submitted by Ricardo Cabral, THEIA.

7 **Social Entrepreneurship Challenge**
Zuri – An AI-Enabled Platform for Monitoring and Regulating Farm Fires in India submitted by Abhilasha Purwar.

Text and images supplied by AZO Anwendungszentrum GmbH Oberpfaffenhofen who, since 2011, organizes the Copernicus Masters on behalf of the European Space Agency (ESA).

The Copernicus Masters winners in the category Social Entrepreneurship Challenge 2019 were the India-based Zuri company for their entry titled An AI-Enabled Platform for Monitoring and Regulating Farm Fires in India. Representatives of Zuri, Abhilasha Purwar and her brother Kshitij Purwar receive their prize from Astrosat's Steve Lee.

COVID-19: Chinese lessons for Africa

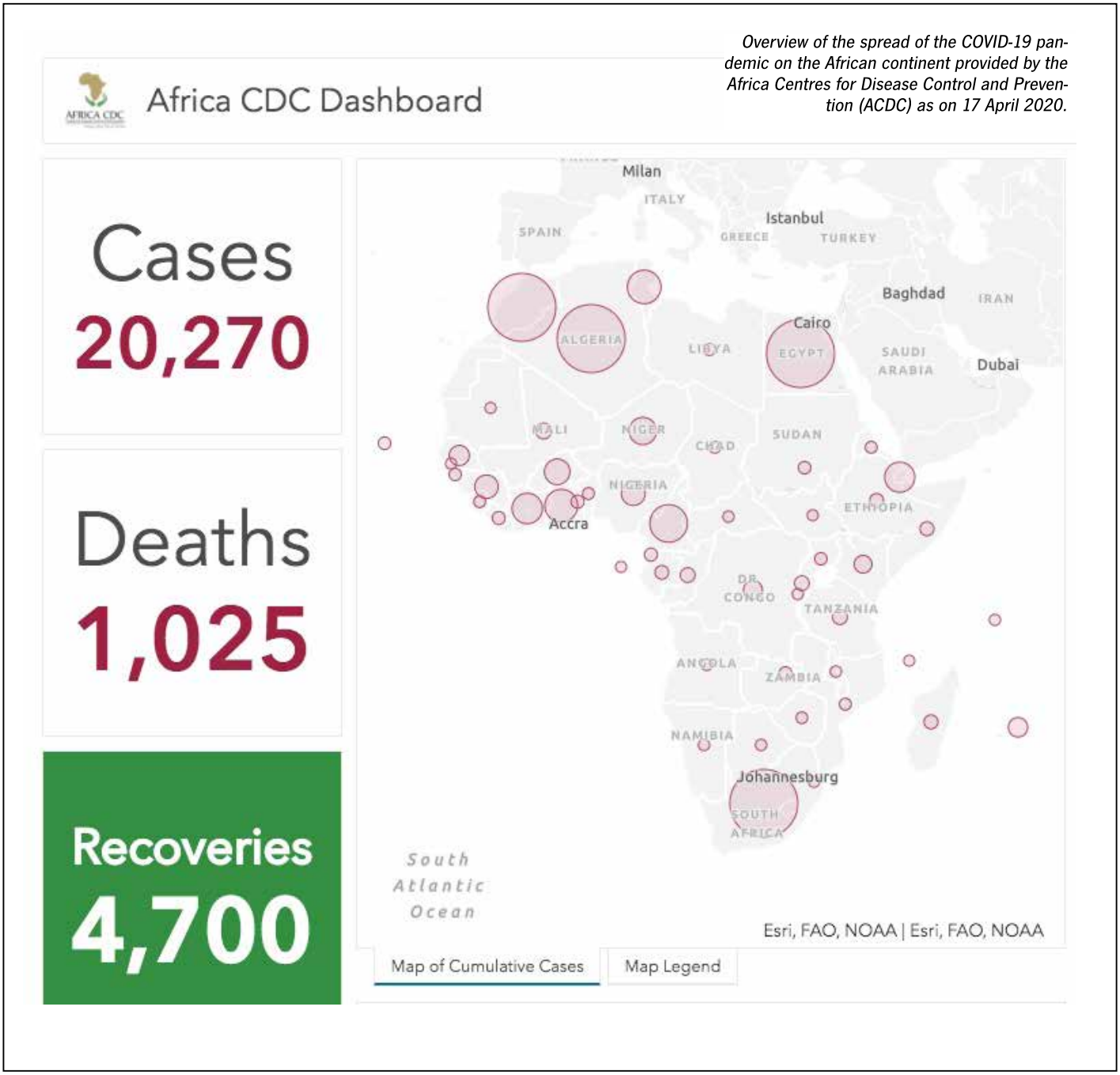
The novel coronavirus disease (COVID-19) was first reported in the Chinese city of Wuhan on 31 December 2019. The genetic sequence of the virus was shared with the World Health Organization (WHO) on 12 January 2020 and the first case appeared outside China in Thailand on 13 January 2020. By 20 January with almost 300 cases already reported in China one of their leading experts declared it to be transmittable among humans. From then on the battle was on and the city of Wuhan a metropolis of 11 million people went into lockdown and the construction of new hospitals were started to absorb the expected escalation of patients infected with the virus.

The WHO declared the outbreak a Public Health Emergency of International Concern on 30 January 2020 and 11 February 2020 announced a name for the new coronavirus disease: COVID-19.

While the pandemic spread worldwide affecting at least 210 countries with more than two million people affected and tragically more than 150 00 deaths reported by mid-April the Chinese seem to have the outbreak of new infections under control and life is slowly returning to normal in their country.

Below follows examples of how the Chinese applied the tools of remote sensing to fight the disease which can also find application on the African continent should it become necessary.

Continued on page 13 ...



Overview of the spread of the COVID-19 pandemic on the African continent provided by the Africa Centres for Disease Control and Prevention (ACDC) as on 17 April 2020.

Members of a police sanitation team spray disinfectant as a preventive measure against the spread of the Covid-19 coronavirus in Bozhou, in China's eastern Anhui province. (AFP via Getty Images)

...continued from page 12

1 Drones

Drones guided by China's BeiDou Navigation Satellite System (BDS) proved to be very effective with the battle against the spread of the virus and were employed in a number of ways such as:

Delivering packages especially medicines as it is faster than travelling overland and minimizes personal contact;

Cameras and loudhailers were fitted to drones to issue health warnings when people were in too close proximity of each other or not wearing masks;

Drones previously used in the agricultural industry to spray pesticides were re-assigned to spray disinfectant in public spaces, industrial and residential areas, and on epidemic prevention vehicles traveling between impacted areas

Thermal cameras fitted to drones could measure people's temperatures from afar. This method has been criticized as being inaccurate and also dangerous as drones have to fly up real close to a person to check their temperature. Australian drone maker Draganfly claims that it is working on technology that will soon use thermal sensors onboard a drone that will enable an intelligent computer vision system to monitor the temperature, heart, and respiratory rates of humans at a distance.

Drones were also used to scan QR codes (access codes) on drivers' cell phones while sitting in their cars waiting in long queues at toll gates, etc. to get clearance to enter certain areas.

2 Health Apps

During the initial stages, the peak and finally when the outbreak of new infections came under control Chinese authorities applied a variety of apps in conjunction with big data applications to track and contain the pandemic. They were inter alia:

The Wuhan Mini Neighborhood App

Wuhan residents who suspected they have symptoms of the coronavirus were encouraged to fill out the health profile on this app which gave medical staff the patient's exact address through the BeiDou position system and the opportunity to check on them. The positioning of acutely affected persons also enabled the authorities to identify large numbers of infected people and enforce lockdown measures to minimize the contact with other people and also administer the necessary treatment. This app was promoted on WeChat the Beidou GNSS-based social app with the biggest number of users in China.

Close Contact Detector App

This app tracks people and alerts them if they have been in close contact with someone who has been confirmed infected with the coronavirus. The app will then advise both to stay at home and at the same time alert the authorities. Users only have to enter their name and ID number and then the app will tell also tell them about potential cases such as caregivers, passengers and crew members who may have been on the same train or plane as those suspected of being exposed to the virus.

The Health QR code

With the coronavirus in decline and restriction being eased residents of Wuhan city were still required to register an online mini program on their phones to get a Health QR Code as clearance. The code comes in different colours and only those with green codes are allowed to move around freely. This system has now been adopted by more than 200 Chinese cities.

3 Smart Epidemic Prevention Management Platforms, Artificial Intelligence (AI), robots and telemedicine

A number of 'Smart Platforms' developed by private companies became available during the crisis. These platforms would connect to the database of infected persons provided by the Chinese Centre for Disease Control and Prevention (CDC) and with the inputs of the BeiDou Navigation Satellite System it could draw up real-time positioning of infected persons and so identify the growth of hotspots. This in turn would then alert commuters, delivery vehicles, etc. how to avoid the contagious areas. The HaiGe Smart Epidemic Prevention Management Platform was a typical application.

Another type of platform would provide free information services such as health condition self-check, epidemic Q&As, psychological self-assessment, and an epidemic community search. During the questioning the platform applies AI to summarize various types of questions and provide authoritative answers to relieve overstretched medical staff. The platform called AskBob was a typical one launched in the Hubei, Heilongjiang, Liaoning, Shandong, Fujian, Jiangsu and Guangdong provinces.

A Smart Field Hospital capable of serving 20 000 patients largely by robots was also erected at the Hongshan Sports Center in Wuhan with the assistance of Wuhan Wuchang Hospital, China Mobile and CloudMinds. Patients entering the hospital were fitted with smart bracelets and synced to the CloudMind AI platform which checked their vital signs such as temperature, heart rate and blood oxygen levels. Doctors and nurses also wore these devices to warn them of early signs of infections. Other robots provided food, drinks and medicine to patients or sprayed disinfectant and cleaned the floors.

Telemedicine or the use of video chats or the telephone for consultations also became hugely popular with demands growing more than tenfold in China since the coronavirus epidemic began.

Report by Anthony Penderis

Sources
cnbc.com; global.chinadaily.com.cn; news.cgtn.com; un-spider.org; spacewatch.global; esa.int; who.int; africacdc.org

International Space Conference Diary

We have compiled the details of some of the most important international and African conferences scheduled to take place within the next few months in the arena of remote sensing, satellites and geotechnical applications. Please visit their individual websites for more information on submission criteria for papers, deadlines for registration, etc. and also note that some of these events have been rescheduled due to the COVID-19 crisis.

Satellite & Space Missions 2020
July 15 - 16, 2020
London, UK
https://satellite.insightconferences.com

The conference is an amalgamation of research professionals from universities, space centres, research labs, spacecraft industries and other space research organizations creating an atmosphere conducive for information exchange between academia and industries. It provides a platform for researcher scholars, scientists and academicians to share while business sectors can promote their products.

GEO Week 2020
July 27 - 29, 2020
Chicago, USA
https://www.geo-week.com

The Geo Week team has secured new dates and a new location for the 2020 edition of Geo Week following the unavoidable postponement of its Washington DC, March event which was triggered by the restrictions on gatherings because of the COVID-19 pandemic. Due to the postponement pre-registered attendees are allowed the options to rescheduled for either the Jul 27-29, 2020 or the Feb 8-10, 2021 event in Denver, Co. Contact info@geo-week.com for more information.

Space Tech Expo
August 11 - 12, 2020
Long Beach, California, USA
http://www.spacetechexpo.com/

A showcase of space-related technologies and innovations from systems and sub-systems, components, testing and manufacturing technologies for civil, military and commercial space applications. For the first time in its history, the conference will be free for all attendees. More than 250 exhibitors are expected. A masterclass on manufacturing and implementing industry 4.0 technologies will be offered.

Global Space Exploration Conference
September 1 - 3, 2020
St. Petersburg, Russia
http://www.iafastro.org/

The Conference, co-organized by the International Astronautical Federation (IAF) and Roscosmos, will bring together leaders and decision-makers within the science and human exploration community – engineers, scientists, entrepreneurs, educators, agency representatives and policy makers. They will discuss current challenges and innovative solutions and learn how space exploration investments can provide benefits.

5G -Next digital revolution in Africa
October 7 - 8, 2020
Johannesburg, South Africa
https://mjdvent.com

The next generation 5G wireless will allow virtually every industry to deliver advanced connectivity and increased intelligence across the rapidly evolving wireless edge at speeds projected to be five times faster than the current 4G. Industry stakeholders will come together to discuss the challenges of this next digital revolution to hit Africa from this year onwards.

71st International Astronautical Congress
October 16 – 20, 2020
Dubai, UAE
http://iac2020.org/

The IAC draws in over 4000 participants from around the world each year. This includes top space agency officials and delegations, astronauts, industry stalwarts, scientists and engineers, researchers and academics, young professionals and students, the press and members of the public. It provides an opportunity for participating organisations to share their innovations in the space sector.

AARSE 2020
October 26 - 30, 2020
Kigali, Rwanda
www.aarse2020.org

The 13th AARSE International Conference, AARSE 2020 will be held in Kigali, Rwanda, organized by the Institut d'Enseignement Supérieur de Ruhengeri (Ines-Ruhengeri). It is the premier forum in Africa for research on remote sensing technologies and geospatial information science, gathering leading scholars from the remote sensing and related communities to discuss challenges in space and geospatial technologies.

NewSpace Africa Conference
November 9 - 11, 2020
Addis Ababa, Ethiopia
https://mjdvent.com

This will be a high-level gathering of industry leaders, commercial space companies, investors and other key stakeholders in the African Space Industry. Attendees will include leaders of national space agencies, the African Union Commission, NewSpace companies, representatives of National Ministries of Science and Technology and Communications, policymakers and government officials, satellite manufacturers and operators, etc.

GIS Congress 2020
November 23 - 24, 2020
Barcelona, Spain
https://gis-remotesensing.environmental-conferences.org

This 6th International Conference with the theme "Application of GIS and Remote Sensing Techniques"will feature valuable keynote presentations, talks, poster presentations and exhibitions. Rearchers, scientists, academic fellows, exhibitors and contributors in the field of Remote Sensing, Geographic Information Systems (GIS), Techniques and Technology, Renewable Energy Sources, etc are invited.

DART on track for launch next year July

The Double Asteroid Redirection Test (DART) – NASA's first mission to demonstrate a planetary defence technique – will get one chance to hit its target, the small moonlet in the binary asteroid system Didymos. The asteroid poses no threat to Earth and is an ideal test target: measuring the change in how the smaller asteroid orbits about the larger asteroid in a binary system is much easier than observing the change in a single asteroid's orbit around the Sun.

The DART spacecraft will achieve the kinetic impact deflection by deliberately crashing itself into the moonlet at a speed of approximately 6.6 km/s, with the aid of an onboard camera (named DRACO) and sophisticated autonomous navigation software. The collision will change the speed of the moonlet in its orbit around the main body by a fraction of one percent, but this will change the orbital period of the moonlet by several minutes - enough to be observed and measured using telescopes on Earth.

The DART mission currently is targeted to launch in June 2021 on a Falcon 9 rocket from Space Launch Complex 4E at Vandenberg Air Force Base in California. By using solar electric propulsion, DART will intercept the asteroid Didymos' small moon in October 2022, when the asteroid will be within 11 million kilometers from Earth.

Source: https://www.nasa.gov

OneWeb files for bankruptcy

OneWeb Satellites the company which once lead the internet broadband satellite constellation race has suddenly filed for bankruptcy after it already launched 74 satellites of an intended fleet of 650 which they promised would eventually grow to 1,972 in total.

Citing the COVID-19 pandemic as the reason for their downturn some experts do not agree as they saw the writing on the wall after their main backer the Japanese SoftBank refused to extend their loan to more than $2 billion well before the outbreak became a global pandemic. OneWeb has now joined Iridium, Globalstar, Orbcomm and Teledesic and LeoSat as the list of companies which ran out of money while deploying, or attempting to deploy, low-flying constellations of communication satellites.

OneWeb was a joint venture with Airbus with Greg Wyler CEO and founder at the helm. The bankcruptcy will have an impact on a number of its suppliers and unsecured creditors such as Cobham, Sodern, Syrlinks, Hughes, Arianespace, SolAero Teledyne, MDA and Arianespace many of which expanded their production facilities to cater for the expected huge scale of satellite manufacturing.

Sources: en.wikipedia.org; spacenews.com

Long-duration spaceflight enlarges brain volume

"Long-duration spaceflight was associated with increased pituitary deformation, augmented aqueductal cerebrospinal fluid (CSF) hydrodynamics, and expansion of summated brain and CSF volumes. Summated brain and CSF volumetric expansion persisted up to 1 year into recovery, suggesting permanent alteration," is the conclusion of a study on 11 astronauts published by Kramer LA et al in the RSNA Radiology Journal on 14 April 2020.

The MRI study enrolled astronauts with planned long-duration spaceflights. Measures were conducted before spaceflight followed by 1, 30, 90, 180, and 360 days after landing. Intracranial volumetry and aqueductal CSF hydrodynamics were quantified for each phase. Qualitative and quantitative changes in pre- to postflight (day 1) pituitary morphologic structure were determined. Statistical analysis included separate mixed-effects models per dependent variable with repeated observations over time.

Eleven astronauts (mean age, 45 years; 10 men) showed increased mean volumes in the brain, white matter, mean lateral ventricles, and mean summated brain and CSF at postflight day 1 with corresponding increases in mean aqueductal stroke volume and mean CSF peak-to-peak velocity magnitude. Summated mean brain and CSF volumes remained increased at 360 days after spaceflight. Qualitatively, six of 11 (55%) astronauts developed or showed exacerbated pituitary dome depression compared with baseline. Average midline pituitary height decreased from 5.9 to 5.3 mm.

The paper titled *Intracranial Effects of Microgravity: A Prospective Longitudinal MRI Study* can be read at https://doi.org

Rosalind Franklin ExoMars Rover launch postponed

Rosalind Franklin gets to view the 1:1 scale model of the Rosalind Franklin ExoMars Rover named after her aunt at the European Space Agency (ESA) technical centre in the Netherlands. The Rover was named in honour of her aunt Dr Rosalind Franklin (1920-1958) well known for being central to the discovery of the iconic double-helix structure of DNA, the fabric of life as we know it on Earth.

ESA and the Roscosmos Space Corporation have decided to postpone the launch of the ExoMars mission to study the Red Planet to 2022 citing the COVID-19 pandemic partly as the reason. The new schedule foresees a launch between August and October 2022. Celestial mechanics define that short launch windows of 10 days each every two years exist in which Mars can be reached from Earth. Source and image: ESA

COVID-19 puts some mayor NASA projects on hold

– agency keeps critical work alive –

The COVID-19 Pandemic has forced NASA to have most of its employees working from home and suspend work on some of its mayor projects. At the same time it is keeping time-sensitive mission-critical launches, or work to protect life and critical infrastructure alive.

Work on the James Webb Space Telescope, their Space Launch System (SLS) and Orion rocket manufacturing and testing activities were all put on hold and will be reassessed over the next few weeks as the COVID-19 situation unfolds. Mission critical launches such as the Mars 2020 Perseverance Rover and Helicopter continues as well as all work associated with supporting the International Space Station operations.

In a recent NASA media release their Administrator Jim Bridenstine said: "We are going to take care of our people that's our first priority. Technology allows us to do a lot of what we need to do remotely, but, where hands-on work is required, it is difficult or impossible to comply with CDC guidelines while processing spaceflight hardware, and where we can't safely do that we're going to have to suspend work and focus on the mission critical activities."

The agency has defined mission-essential work as that which must be performed to maintain critical mission operations to ensure the schedule of time-sensitive mission-critical launches, or work to protect life and critical infrastructure. This includes work to support America's national security and mission-essential functions for the nation. NASA leadership will continually assess all activities as the situation evolves.

NASA's Mars 2020 mission, which includes the Perseverance Rover and Mars Helicopter, remains a high priority for the agency, and launch and other mission preparations will continue. Much of the work is being done by employees and contractors who work remotely across the agency. Assessments by agency leadership are underway for anyone required to work in areas under restriction, such as NASA's Jet Propulsion Laboratory in Pasadena, California, especially after the recent announcement by California's governor.

Work on the agency's Artemis program continues with limited production of hardware and software for NASA's Space Launch System (SLS) rocket. The SLS and Orion manufacturing and testing activities at NASA's Michoud Assembly Facility and Stennis Space Center are temporarily on hold.

Since the Human Landing System program leverages capabilities across the agency, it already functions as a virtual team to conduct engineering analysis and other work, and it has seen minimal impact from the requirement for mandatory telework. Most development work on the Gateway program continues and can be done remotely, however, any on-site activity beyond securing hardware is temporarily suspended until further notice.

The James Webb Space Telescope team in California, is suspending integration and testing operations. Decisions could be adjusted as the situation continues to unfold over the weekend and into next week. The decision was made to ensure the safety of the workforce. The observatory remains safe in its cleanroom environment.

The James Webb Space Telescope due for launch in 2021 has just passed a number of critical mirror-folding and zero gravity simulated tests by the Northrop Grumman team in California. Work however has now been suspended until the COVID-19 situation clears up and allows a safe working environment for the team. The Webb telescope will supplement the Hubble Space Telescope and allow us to peer even deeper into the universe. Image: NASA

Also in California, work continues by Lockheed Martin on X-59 NASA's first large-scale, piloted X-plane in more than 30 years, while NASA oversight and inspections will be conducted almost exclusively virtually.

All work associated with supporting International Space Station operations continues. Flight controllers are working in the Mission Control Center at Johnson Space Center in Houston, where a number of additional measures went into effect in early March to reduce the risk of exposure to the team.

NASA also is supporting mission-essential operations for all spacecraft. This encompasses the Hubble Space Telescope and space communications network, as well as satellite missions that support the National Oceanographic and Atmospheric Administration and Department of Defense, including those that provide critical weather and GPS data.

Most of the agency remains under a Stage 3 status, with mandatory telework for all employees with limited exceptions for on-site work. Ames, Michoud, and Stennis are at Stage 4 with personnel on-site to protect life and critical infrastructure. NASA leadership continues to monitor developments regarding COVID-19 around the nation and follow the guidance from the White House Coronavirus Task Force, Centers for Disease Control and Prevention, and local and state health officials in order to keep the NASA community safe.

For more information about NASA and agency programs, visit: https://www.nasa.gov